

Accelerating adoption of zero tillage in rice-wheat system in the Indo-Gangetic plains

Proceedings/Report


on

Zero Tillage FFS Curricula Development Workshop



October 29, 2002

**Organized by
National Agriculture Research Centre, Park Road Islamabad
CABI Regional Bioscience Centre Pakistan, Rawalpindi
On-Farm Water Management, Lahore**



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Zero Tillage FFS Curricula Development Workshop

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National Coordinated Rice-wheat Program

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Rice Wheat Program NARC

Dr. Mohammad Salim, P.I.

Cooperating Institutions and Scientists

Rice Program

Dr. Riaz A. Mann

Dr. Abdul Rehman

Mr. Moammad Akram

Mr. M. Ramzan

Wheat Program

Dr. Nafees Sadiq Kisana

Dr. Syed Ghazanfar Abbass

Dr. Imtiaz Ahmad

Pulses Program

Dr. Mohammad Bashir

Farm Machinery Institute

Dr. Nadeem Amjad

Mr. Shabir Ahmed Kalwar

Dr. Waheed Zafar

Crop Diseases Research Program

Dr. Iftikhar Ahmed

Dr. Anjum Munir

Land Resources Research Program

Dr. Mohammad Saleem Akhter

Dr. Fayyaz Hussain

Dr. M. Yasin

Dr. M. Aslam

Social Sciences Institute

Dr. M. Azeem Khan

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Mr. M. Ghayyur Khan

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On Farm Water Management

Mr. Mushtaq Ahmad Gill

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Dr. M. Ashraf Poswal

Mr. Ghulam Ali

Organizing Committee

Dr. Abdul Rehman

Mr. Ghulam Ali

In recent past various resource conservation technologies have been adopted to improve the productivity of rice-wheat system. Of these adoption of zero-tillage for timely planting of wheat after rice harvest was popularized among the farming community. On-Farm Water Management (OFWM) promoted this technology in a big way and claimed to plant wheat on 0.2 million acres with zero tillage drill during year 2001-02 crop season. However, new challenges are emerging in the adoption of this technology on large scale.

Rice-Wheat Research Programme of NARC is running a programme in collaboration with CABI Bioscience and OFWM to address these challenges in association with farmers through Farmer Field School (FFS). In this regard, a one-day curriculum development workshop was organized on October 29, 2002 at NARC to focus and prioritize the issues and their solutions. Some 40 scientists from various organizations involved in rice-wheat research and development activities participated in the workshop. For that We are very much obliged to all participants for their useful contribution in the workshop.

We would like to thank Dr. Badaruddin Soomro Chairman PARC, Dr. Naeem I. Hashmi, DG NARC, Dr. Abdul Shakoor, DDG, IFHC, Dr. Iftikhar Ahmad National Coordinator Rice-Wheat Programme and Dr. M. Salim Coordinator Rice for their encouragement and support. We also thank to Mr. Mushtaq Ahmad Gill DG OFWM and Dr. M. Ashraf Poswal Director CABI Bioscience for their all cooperation and collaboration in the organizing of this workshop. Thanks are also due to Dr. Craig Meisner CIMMYT Agronomist for technical and financial support.

Thanks again to all of those who have contributed in one way or the other in holding the workshop successfully.

Dr. Abdul Rehman
Mr. Ghulam Ali
Workshop Organizers

Project Title: Accelerating adoption of zero tillage in rice-wheat system in the Indo-Gangetic plains

Executing Agency:

National Agricultural Research Centre, Islamabad
CABI Regional Bioscience Centre Pakistan, Rawalpindi
On-Farm Water Management, Lahore

Planning and Execution:

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Mr. Mushtaq Ahmad Gill, DG On-Farm Water Management
Dr. Abdul Rehman, Rice Programme, NARC
Mr. Ghulam Ali, Scientific Officer, CABI Bioscience
Mr. Hafiz Mujeeb, On-Farm Water Management

Workshop Organizer:

Dr. Abdul Rehman, Rice Programme NARC
Mr. Ghulam Ali, Scientific Officer, CABI Bioscience

Facilitators:

Dr. M. Ashraf Poswal, Centre Director, CABI Bioscience
Mr. Ghulam Ali, Scientific Officer, CABI Bioscience

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Dr. Abdul Rehman Rice Programme NARC

1.0 Introduction

Conventional tillage operations in north-west Indo-Gangetic plains including Pakistan and India generally require 6 to 8 ploughing followed by 2-3 planking before the wheat crop is sown after harvesting the rice crop. This entails high costs, results in delayed sowing and affects the wheat yield adversely.

However, for the farmers to gain confidence and make their own decisions, a considerable understanding of agro-ecological processes is required, particularly farmers need to understand the role of zero tillage technology in rice-wheat production system. For these reasons, the Farmer Field School approach is being used for the adoption of zero tillage in rice-wheat system.

The main aim of the workshop was to identify the technical issues related with the adoption of zero tillage technology. The major issues emerged in the areas of post harvesting of rice, stubble management, soil fertility management, weeds management, pest management, wheat planting time, seed quality, plant nutrition, water management, informal participatory training, zero tillage manufacturing and socio economic conditions of the farmers. Brief review of the workshop is described here under;

2.0 Workshop programme

Dr. M. Salim, Coordinator rice NARC, briefed about the history of zero tillage technology, research studies conducted and results achieved in Pakistan. Dr. Azeem Khan briefed about the issues and challenges of zero tillage impact study. Dr. M. Ashraf Poswal, Centre Director CABI, Pakistan explained the philosophy of Farmer Field School (FFS).

Programme

October 29, 2002

0945	Registration of participants
0900	Recitation from the Holy Quran
0905	Brief remarks regarding zero tillage by Dr. M. Salim
0910	Introduction of the workshop by Ghulam Ali
0920	Issues and challenges of zero tillage adoption by Dr Azeem Khan
0930	Workshop business
1030	Tea break
1100	Workshop business
1300	Lunch & prayer break
1400	Workshop business
1530	Tea break
1545	Workshop business
1700	Workshop concludes

3.0 Curricula for FFS programme on zero tillage - wheat management

On the basis of thorough discussions the issues/exercises were prioritized into three categories;

- Issues that **Must** be included in the curricula.
- Issues that **Should** be included in the curricula.
- Issues that are **Nice** to be included in the curricula.

Target	Issues	Activities / Exercises	Remarks
Pre - planting	Organic matter & fertility management	Do not burn the crop residues	Must be included
		Green manuring during the fallow period between harvesting of wheat crop & planting of rice	Should be included. Conduct participatory study trial
		Soil testing/analysis	Nice to be included
		Zero tillage improves organic matter	Conduct participatory study trials
	Zero tillage enhance salinity	Threshing out soil types	Should be included Conduct participatory study trials
	Seed quality	Sow the certified seed	Must be included
		Seed dressing with fungicides	Should be included
	Land preparation & residue management	Management of rice stubbles	Must be included
		Break up the hard pan of soil after every two years developed by rice sowing	Nice to be included
	Integrated pest management	Wheat ecosystem analysis	Must be included
		Use of minimum till to lacerate rice stubbles	Should be included
		Monitoring of stem borer hibernation	Must be included Conduct participatory study trials
		Role of predators & parasitoids in controlling insect pests of wheat & rice	Must be included Conduct participatory study trials
		Farmers' participatory training in identifying insect pests, diseases & natural enemies	Must be included

		Farmers' participatory training on conservation of bio control agents	Must be included
	Soil moisture management	Use of residual moisture coupled with minimum tillage	Must be included
		Observe the moisture level in the field	Should be included
		If high moisture then wait & use zero tillage technique	Should be included
		If very low moisture, soak the seed & then sow it	Must be included
		Spread the rice straw in the field after wheat sowing to conserve moisture	Must be included Conduct the participatory study trials
Post - planting	Stand establishment Poor germination, plant population, missing hills with zero tillage drill, yellowing & death of seedlings	Optimum planting time	Must be included Conduct the participatory study trials
		Use of optimum moisture	Must be included
		Avoid seed suffocation for more than 12 hrs through drainage	Should be included
		Use of good quality seed	Must be included
		Proper fertilizer placement	Must be included
	Weed management	Proper weedicides applications	Should be included
		Mechanical weed control	Must be included Conduct the participatory study trials
		Competition studies of weeds management in zero tillage & conventional technology	Should be included Conduct the participatory study trials
		Weeds monitoring & its identification to farmers'	Must be included
	Water management More number of irrigations, rain fall in poorly drained soils, delayed first irrigation, non availability of irrigation water & last irrigation	Moisture management at critical stages of crop growth	Must be included

		Increase water use efficiency	Must be included
		Bed planting instead of zero tillage	Should be included
		Apply water on crop need basis	Must be included Conduct the participatory study trials
	Integrated pest management	IPM strategies to control insect pests & diseases	Must be included
		Monitoring of insect pests, diseases & natural enemies	Must be included Conduct the participatory study trials
		Sowing of disease resistant wheat varieties	Should be included
		Use of baits, fumigants & traps for rodents control	Must be included Conduct the participatory study trials in zero tillage & conventional sowing
	Fertility management	Fertilizer application on crop need basis	Must be included Conduct the participatory study trials
		Application of nitrogen fertilizer?	Should be included
Socio - economic	Community development Tradition, mindset & social awareness	Social organization	Must be included
	Non availability of quality inputs	Farmers' support units	Should be included
	High cost of inputs & marketing of produce	Farmers' support units	Should be included
	Micro credit facility	Farmers' support units	Should be included
	Economic feasibility	Measure the cost / benefit ratio	Should be included
	Quality of zero tillage drill	Assurance of quality drill Development of service providers	Should be included

4.0 Options for technology recommendations

Moisture	Turnaround time	Harvesting method	Soil type/ condition	Option
Low / medium	< 2 week	Manual	Normal	Zero tillage
Low / medium	< 2 week	Combined	Normal	Zero tillage with different version drill
Low / medium	< 2 week	Manual	Hard pan, salinity	Zero tillage
Low / medium	< 2 week	Manual	Hard pan	Seed soaking & zero tillage
High (tractor can be operated)	< 2 week	Manual	Normal	Zero tillage
High (tractor can be operated)	< 2 week	Combined	Normal	Improved zero tillage drill
Low / medium	> 2-3	Manual	Normal	Conventional with rabi drill
High (tractor can be operated)	> 2-3	Manual	Normal	Wait for proper moisture & zero tillage
High (tractor can be operated)	> 2-3	Combined	Normal	Wait, use disc & conventional rabi drill
High (tractor can be operated)	> 2-3	Manual	Salinity & poor drained	Bed planting

5.0 Action point/activities

Based on the recommendation exercises a season long schedule was developed for holding Farmer Field Schools in the rice-wheat system. In this regard five FFS sites were selected in the rice growing area along Muridke-Sheikhupura road. Each FFS comprises of 25 farmers. The FFS sites are in the following villages:

- Chak 29
- Snata
- Pindi Rattan Singh
- Khushalpura
- Juianwala

Tentative Farmer Field Schools activities schedule for zero tillage on wheat management during 2002-2003

Date	Place	Activities	Resource Person
7-11-02	FFS site Chak 29	Selection of FFS sites. Meeting with the farmers. Introduction of the programme to the farmers.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC Hafiz Mujeeb OFWM
7-11-02	FFS site Snata	Selection of FFS sites. Meeting with the farmers. Introduction of the programme to the farmers.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC Hafiz Mujeeb OFWM
8-11-02	FFS site Pindi Rattan Singh	Selection of FFS sites. Meeting with the farmers. Introduction of the programme to the farmers.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC Hafiz Mujeeb OFWM
8-11-02	FFS site Khushal- pura	Selection of FFS sites. Meeting with the farmers. Introduction of the programme to the farmers.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC Hafiz Mujeeb OFWM
9-11-02	FFS site Juianwal a	Selection of FFS sites. Meeting with the farmers. Introduction of the programme to the farmers.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
25-11-02	FFS site Chak 29	Selection of seed variety and seed dressing with fungicide. Seed bed preparation & sowing of wheat. What is this? Identification of the issues in operation of zero tillage drill. Group dynamic (Mirror game).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM

26-11-02	FFS site Snata	Selection of seed variety and seed dressing with fungicide. Seed bed preparation & sowing of wheat. What is this? Identification of the issues in operation of zero tillage drill. Group dynamic (Mirror game).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
27-11-02	FFS site Pindi Rattan Singh	Selection of seed variety and seed dressing with fungicide. Seed bed preparation & sowing of wheat. What is this? Identification of the issues in operation of zero tillage drill. Group dynamic (Mirror game).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
28-11-02	FFS site Khushal- pura	Selection of seed variety and seed dressing with fungicide. Seed bed preparation & sowing of wheat. What is this? Identification of the issues in operation of zero tillage drill. Group dynamic (Mirror game).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
29-11-02	FFS site Juianwal a	Selection of seed variety and seed dressing with fungicide. Seed bed preparation & sowing of wheat. What is this? Identification of the issues in operation of zero tillage drill. Group dynamic (Mirror game)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
16-12-02	FFS site Chak 29	Forming participants in to groups (Number game). Selection of group leaders. Responsibilities of group leader. Check germination percentage and water requirement of the crop. Management of the issues regarding zero tillage drill during the last FFS. Pre FFS test	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
17-12-02	FFS site Snata	Forming participants in to groups (Number game). Selection of group leaders. Responsibilities of group leader. Check germination percentage and water requirement of the crop. Management of the issues regarding zero tillage drill during the last FFS. Pre FFS test	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM

18-12-02	FFS site Pindi Rattan Singh	Forming participants in to groups (Number game). Selection of group leaders. Responsibilities of group leader. Check germination percentage and water requirement of the crop. Management of the issues regarding zero tillage drill during the last FFS. Pre FFS test	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
19-12-02	FFS site Khushal- pura	Forming participants in to groups (Number game). Selection of group leaders. Responsibilities of group leader. Check germination percentage and water requirement of the crop. Management of the issues regarding zero tillage drill during the last FFS. Pre FFS test	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
20-12-02	FFS site Juianwal a	Forming participants in to groups (Number game). Selection of group leaders. Responsibilities of group leader. Check germination percentage and water requirement of the crop. Management of the issues regarding zero tillage drill during the last FFS. Pre FFS test	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
30-12-02	FFS site Chak 29	Wheat ecosystem analysis (WESA), collecting the data from the wheat field, analyzing the data and making technical decisions for cultivation measures. Wheat physiology at seedling stage. Special topic: Rice stubble management. Advantages & disadvantages of rice stubbles burning. Management of the issues regarding zero tillage drill evolved during the last FFS. Communication exercise (Chinese whisper)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM Resource person (wheat agronomist)

31-12-02	FFS site Snata	Wheat ecosystem analysis (WESA), collecting the data from the wheat field, analyzing the data and making technical decisions for cultivation measures. Wheat physiology at seedling stage. Special topic: Rice stubble management. Advantages & disadvantages of rice stubbles burning. Management of the issues regarding zero tillage drill evolved during the last FFS. Communication exercise (Chinese whisper)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM Resource person (wheat agronomist)
1-1-03	FFS site Pindi Rattan Singh	Wheat ecosystem analysis (WESA), collecting the data from the wheat field, analyzing the data and making technical decisions for cultivation measures. Wheat physiology at seedling stage. Special topic: Rice stubble management. Advantages & disadvantages of sice stubbles burning. Management of the issues regarding zero tillage drill evolved during the last FFS. Communication exercise (Chinese whisper)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM Resource person (wheat agronomist)
2-1-03	FFS site Khushal- pura	Wheat ecosystem analysis (WESA), collecting the data from the wheat field, analyzing the data and making technical decisions for cultivation measures. Wheat physiology at seedling stage. Special topic: Rice stubble management. Advantages & disadvantages of sice stubbles burning. Management of the issues regarding zero tillage drill evolved during the last FFS. Communication exercise (Chinese whisper)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM Resource person (wheat agronomist)

3-1-03	FFS site Juianwal a	Wheat ecosystem analysis (WESA), collecting the data from the wheat field, analyzing the data and making technical decisions for cultivation measures. Wheat physiology at seedling stage. Special topic: Rice stubble management. Advantages & disadvantages of sice stubbles burning. Management of the issues regarding zero tillage drill evolved during the last FFS. Communication exercise (Chinese whisper)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM Resource person (wheat agronomist)
13-1-03	FFS site Chak 29	WESA of wheat crop. Drawing and presentation of results. Discussion on precision land leveling. Role of zero tillage drill on various soil types. Identification of critical stages of wheat. Group dynamics (co-operative square) Special topic: life cycle of insect pests, alternate host, volunteer rice	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
14-1-03	FFS site Snata	WESA of wheat crop. Drawing and presentation of results. Discussion on precision land leveling. Role of zero tillage drill on various soil types. Identification of critical stages of wheat. Group dynamics (co-operative square) Special topic: life cycle of insect pests, alternate host, volunteer rice	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
15-1-03	FFS site Pindi Rattan Singh	WESA of wheat crop. Drawing and presentation of results. Discussion on precision land leveling. Role of zero tillage drill on various soil types. Identification of critical stages of wheat. Group dynamics (co-operative square) Special topic: life cycle of insect pests, alternate host, volunteer rice	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM

16-1-03	FFS site Khushal- pura	WESA of wheat crop. Drawing and presentation of results. Discussion on precision land leveling. Role of zero tillage drill on various soil types. Identification of critical stages of wheat. Group dynamics (co-operative square) Special topic: life cycle of insect pests, alternate host, volunteer rice	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
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30-1-03	FFS site Khushal- pura	WESA of wheat crop. Drawing and presentation of results. Fertilizer requirement of the wheat crop. Special topic: Rice stubbles monitoring for insect pests & natural enemies. Ecological function of predators and parasitoids.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
31-1-03	FFS site Juianwal a	WESA of wheat crop. Drawing and presentation of results. Fertilizer requirement of the wheat crop. Special topic: Rice stubbles monitoring for insect pests & natural enemies. Ecological function of predators and parasitoids.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
10-2-03	FFS site Chak 29	WESA of wheat crop. Drawing and presentation of results. Ecological factors affecting wheat crop. Food web in wheat ecosystem. Special topic: Weeds management in wheat ecosystem.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM Resource person (weed ecologist)
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24-2-03	FFS site Chak 29	WESA of wheat crop. Drawing and presentation of results. Soil moisture management. Water holding capacity of soils. Strange insect exercise. Group dynamic (water contest).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
25-2-03	FFS site Snata	WESA of wheat crop. Drawing and presentation of results. Soil moisture management. Water holding capacity of soils. Strange insect exercise. Group dynamic (water contest).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
26-2-03	FFS site Pindi Rattan Singh	WESA of wheat crop. Drawing and presentation of results. Soil moisture management. Water holding capacity of soils. Strange insect exercise. Group dynamic (water contest).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
27-2-03	FFS site Khushal-pura	WESA of wheat crop. Drawing and presentation of results. Soil moisture management. Water holding capacity of soils. Strange insect exercise. Group dynamic (water contest).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
28-2-03	FFS site Juianwal a	WESA of wheat crop. Drawing and presentation of results. Soil moisture management. Water holding capacity of soils. Strange insect exercise. Group dynamic (water contest).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
10-3-03	FFS site Chak 29	WESA of wheat crop. Drawing and presentation of results. Measuring aphid parasitism / predation Group dynamic (conflict resolution exercise)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM

11-3-03	FFS site Snata	WESA of wheat crop. Drawing and presentation of results. Measuring aphid parasitism / predation Group dynamic (conflict resolution exercise)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
12-3-03	FFS site Pindi Rattan Singh	WESA of wheat crop. Drawing and presentation of results. Measuring aphid parasitism / predation Group dynamic (conflict resolution exercise)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
13-3-03	FFS site Khushal- pura	WESA of wheat crop. Drawing and presentation of results. Measuring aphid parasitism / predation Group dynamic (conflict resolution exercise)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
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24-3-03	FFS site Chak 29	WESA of wheat crop. Drawing and presentation of results. Special topic: Wheat nutrition & fertilizer management. Wheat physiology at dough making stage	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM Resource person (wheat agronomist)
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7-4-03	FFS site Chak 29	WESA of wheat crop. Drawing and presentation of results. Special topic: Organic matter management, green manuring and compost formation. Group dynamic (rope game)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
8-4-03	FFS site Snata	WESA of wheat crop. Drawing and presentation of results. Special topic: Organic matter management, green manuring and compost formation. Group dynamic (rope game)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
9-4-03	FFS site Pindi Rattan Singh	WESA of wheat crop. Drawing and presentation of results. Special topic: Organic matter management, green manuring and compost formation. Group dynamic (rope game)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
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21-4-03	FFS site Chak 29	WESA of wheat crop. Drawing and presentation of results. Identification of the issues relating wheat production. Discussion on wheat crop of the season. Group dynamic (creative thinking).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
22-4-03	FFS site Snata	WESA of wheat crop. Drawing and presentation of results. Identification of the issues relating wheat production. Discussion on wheat crop of the season. Group dynamic (creative thinking).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
23-4-03	FFS site Pindi Rattan Singh	WESA of wheat crop. Drawing and presentation of results. Identification of the issues relating wheat production. Discussion on wheat crop of the season. Group dynamic (creative thinking).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
24-4-03	FFS site Khushal- pura	WESA of wheat crop. Drawing and presentation of results. Identification of the issues relating wheat production. Discussion on wheat crop of the season. Group dynamic (creative thinking).	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
25-4-03	FFS site Juianwal a	WESA of wheat crop. Drawing and presentation of results. Identification of the issues relating wheat production. Discussion on wheat crop of the season. Group dynamic (creative thinking)	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
5-5-03	FFS site Chak 29	WESA of wheat crop. Drawing and presentation of results. Collection and compilation of data.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM

6-5-03	FFS site Snata	WESA of wheat crop. Drawing and presentation of results. Collection and compilation of data.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
7-5-03	FFS site Pindi Rattan Singh	WESA of wheat crop. Drawing and presentation of results. Collection and compilation of data.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
8-5-03	FFS site Khushal- pura	WESA of wheat crop. Drawing and presentation of results. Collection and compilation of data.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM
9-5-03	FFS site Juianwal a	WESA of wheat crop. Drawing and presentation of results. Collection and compilation of data.	Ghulam Ali CABI Bioscience Dr Abdul Rehman, NARC WMO from OFWM

6.0 List of participants

1. Dr. M. Aslam Gill Commissioner Special Crops
2. Dr. Maqsood Ahmad, Agronomist, OFWM, Lahore
3. Mr. Hafiz Mujeeb Agronomist OFWM Lahore
4. Dr. Nadeem Amjad PSO/Director FMI
5. Mr. Shabbir A. Kalwar S. Engineer FMI
6. Mr. Mutahir Hussain Asstt. Engineer Oil Seed
7. Dr. Saleem Akhtar SSO LRRP
8. Dr. Ghulam Nabi SSO LRRP
9. Dr. Fayyaz Hussain SSO LRRP
10. Dr. Yasin PSO Soil Fertility LRRP
11. Dr. M. Aslam SSO LRRI
12. Dr. Nafees S. Kasana Coordinator Wheat
13. Dr. Ghazanfar Abbas PSO Wheat
14. Dr. Imtiaz Hussain SO Wheat
15. Mr. M. Akram SSO Rice
16. Dr. A. Rehman SSO Rice
17. Mr. Riaz Ahmad Chattha SSO Rice
18. Dr. Riaz A. Mann SSO Rice Kala Shah Kaku
19. Mr. M. Ramzan SSO Rice Kala Shah Kaku
20. Mr. Ghulam Ali CABI Bio Science
21. Dr. Anjum Munir SSO CDRP
22. Mrs. Shamim Iftikhar SSO CDRP
23. Dr. Iftikhar Hussain SSO Vertebrate IPMI
24. Dr. M. Azeem Khan SSO SSI
25. Mr. M. Zubair Anwar SO SSI
26. Mr. Ghulam M. Sarwar Agronomist RRI KSK
27. Mr. Syed Aksey Mehdi Entomologist RRI KSK
28. Mr. M. Ibrahim Assistant Botanist Wheat AARI, Faisalabad
29. Dr. Shabaz Ahmad Warriach UAA, Rawalpindi

Special Participants

30. Dr. Iftikhar Ahmed DDG IPEP/Coordinator Rice-Wheat
31. Dr. Abdul Shakoor DDG IFHC
32. Dr. M. Salim Coordinator Rice
33. Dr. Manzoor Soomro Coordinator Cotton IPM
34. Dr. M. Ashraf Poswal Director CABI Bio Sciences

